

PATENT ABSTRACTS OF JAPAN

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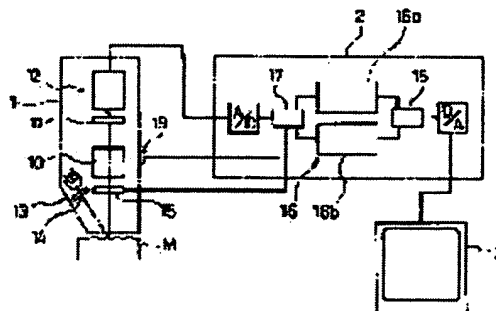
(54) ENLARGING OBSERVATION DEVICE CAPABLE OF PARALLEL OBSERVATION

(57)Abstract:

PURPOSE: To simultaneously and parallelly observe the different kinds of pictures by storing the respective pictures of an observed object seized with the selectively switched different kinds of conditions in interlock with the changeover of the conditions.

CONSTITUTION: The switching means 17 of a control unit 2 is operated through an operation means 19 mounted on, an image pickup device 1 and a polarizing filter 15 is controlled. When the filter 15 is controlled so as to pass polarized light by a polarizer 14, normal pictures including direct reflected light are obtained and stored in a memory 16a for the normal pictures.

Conversely, when it is controlled so as not to transmit the polarized light, non-reflected pictures for which the direct reflected light is eliminated are obtained and stored in the memory 16b for the non-reflected pictures. A normal observation mode or a parallel mode for simultaneously and parallelly reproducing both pictures is selected by a selecting means 18 and the pictures stored in the memory 16 are reproduced at a display 3 by the selected mode.



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3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In expansion observation equipment as displays the image of the observation object caught with the image pick-up implement which has the optical system to which image formation of the image of an observation object is carried out, the image pick-up system which catches the image to which image formation was carried out by optical system, and the illumination system which illuminates an observation object on a display and comes to observe it Expansion observation equipment which is characterized by enabling it to reproduce on a display each heterogeneous image which each image of the observation object alternatively caught on condition that the different species which can be switched was interlocked with the switch of conditions, stored in the storage means, and was stored in this storage means in coincidence juxtaposition and in which juxtaposition observation is possible.

[Claim 2] The expansion observation equipment according to claim 1 enable it to catch alternatively the image and two sorts of images of the nonreflective image which does not include polarization which are alternatively equipped with the polarizing filter which can be intercepted for the incidence to the optical system of the polarization reflected by the polarizer and the observation object which polarization-izes the illumination light by the illumination system, and include polarization, interlock two sorts of these images with change control of a polarizing filter, and it enabled it to usually be stored in a storage means.

[Claim 3] Expansion observation equipment according to claim 1 the illumination system is alternatively equipped with the lighting means which can be irradiated about any two sorts of three sorts of illumination light, an overhead light, side ****, and the transmitted light, or three sorts, interlock with a switch of lighting conditions each image obtained with the lighting twisted for any of these three sorts of illumination light being, and it enabled it to store in a storage means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the expansion observation equipment of a suitable video system method to carry out expansion observation of the observation objects various in various fields, such as cosmetics, medicine, arts and sciences, and industry, easily.

[0002]

[Description of the Prior Art] The expansion observation equipment of a video system method is what consists of an image pick-up implement using a solid state image sensor like CCD, and a monitor display for reproducing and observing the image of the observation object picturized with this image pick-up implement. The image pick-up implement builds in the illumination system which illuminates an observation object, and it can incorporate the image of an observation object, illuminating by the built-in illumination system while building the optical system to which image formation of the image of an observation object is carried out in a solid state image sensor or its light-receiving side. For this reason, the expansion observation equipment of a video system method has the advantage in which expansion observation for the scale factor which could observe, without performing any processing to an observation object, for example, was called 20 to 1000 times can be performed easily, as one of them.

[0003] by the way, if can illuminate on different conditions about the expansion observation equipment of such a video system method, it enable it to observe the image caught on different conditions in coincidence juxtaposition or it enable it to observe by the image which compounded the image of further different conditions, observation and analytic observation at various include angles be attain, and it can expect to utilize the advantage still more effectively.

[0004] As one of them, there is a technique usually alternatively acquired by use of the polarization by the image and the nonreflective image which does not contain such the direct reflected light containing the direct reflected light directly reflected on the front face of an observation object so that JP,2-207401,A may see.

[0005] Although the light in which this was directly reflected on the front face of an observation object is maintaining the polarizability as it is The usual image which the light which is not direct reflection is a thing using the phenomenon of natural-light-izing, and contains the direct reflected light Although it is rich in a cubic effect, it is lacking in the judgment nature of a hue, and it is easy to produce halation. Conversely a nonreflective image Although excelled in respect of the judgment nature of a hue, or halation, it is going to harness the advantage of each image by taking alternatively each image which has merits and demerits so that it may tell a cubic effect that it is scarce, and carrying out comparison observation.

[0006] Moreover, there is a technique which enables it to irradiate various kinds of illumination light alternatively so that it may be indicated by Japanese Patent Application No. No. 38968 [three to], Japanese Patent Application No. No. 201387 [two to], Japanese Patent Application No. No. 201386 [two to], Japanese Patent Application No. No. 201384 [two to], etc. That is, these techniques are enabling use alternative about three sorts of illumination light called side

**** which irradiates an observation object by the acute angle near in parallel to the transverse plane of the overhead light illuminated from a transverse plane, and an observation object, and the transmitted light which illuminates a surface from the inside with the light penetrated inside in the case of the observation object of translucency by using for a point the condensing guide (light guide cap) of the shape of a semi-sphere which has a through-hole.

[0007] That is, although the overhead light exceeds in overall solid observation There is demerit in which the part which does not look partial arises under the effect of the light which the surface reflected light, i.e., exposure light, reflects directly on the front face of an observation object, or it is hard to carry out observation of the color of an observation object. Moreover, side **** It exceeds to enable observation of 7s spacial configurations so that it may be hard to be visible [with an overhead light] by giving shading by the exposure by the acute angle. the transmitted light further although it can use only in the case of the observation object of translucency -- the surface of an observation object -- a certain amount of depth -- with, although each has the advantage and demerit of a proper as observable in shadow picture, it enables it to perform more effective observation by making these illumination light usable alternatively

[0008] However, each of these techniques can only carry out contrast observation of the image caught on condition that different species-like at the time of **, and has a thing still inadequate in [flume] that coincidence juxtaposition-observation of each much more effective image cannot be performed.

[0009]

[Problem(s) to be Solved by the Invention] Therefore, it aims at offer of the expansion observation equipment which enables observation of a heterogeneous image in coincidence juxtaposition in this invention.

[0010]

[Means for Solving the Problem] The optical system to which image formation of the image of an observation object is carried out by this invention for such a purpose, About expansion observation equipment as displays the image of the observation object caught with the image pick-up implement which has the image pick-up system which catches the image which carried out image formation by optical system, and the illumination system which illuminates an observation object on a display and comes to observe it It enables it to reproduce on a display each heterogeneous image which each image of the observation object alternatively caught on condition that the different species which can be switched was interlocked with the switch of conditions, stored in the storage means, and was stored in this storage means in coincidence juxtaposition.

[0011] Moreover, the incidence to the optical system of the polarization reflected by the polarizer and the observation object which polarization-ize the illumination light by the illumination system establishes for the polarizing filter which can be intercepted alternatively, and it enables it to catch alternatively an image and two sorts of images of the nonreflective image which does not include polarization including polarization, two sorts of these images are

interlocked with change control of a polarizing filter, and it enables it to usually store in a storage means about the above structures in this invention.

[0012] Furthermore, each image obtained by the illumination system with any two sorts or the lighting which establishes the lighting means which can be irradiated alternatively three sorts, and is twisted for any of these three sorts of illumination light being of three sorts of illumination light, an overhead light, side ****, and the transmitted light, is interlocked with a switch of lighting conditions, and it enables it to store in a storage means about the above structures in this invention.

[0013]

[Example] Hereafter, the example of this invention is explained.

The example of the 1st ***** is an example using polarization, and as shown in drawing 1, the expansion observation equipment for it is equipped with the image pick-up implement 1, the control unit 2, and the display 3, and observes by reproducing the image of the observation object M caught with the image pick-up implement 1 on the screen of a display 3 through a control unit 2.

[0014] The image pick-up implement 1 builds in the optical system 10 which comes to contain an optical lens, a diaphragm, etc., the image pick-up system 12 using a solid state image sensor 11 like CCD, and the illumination system 13 which illuminates the observation object M, and while the polarizer 14 which polarization-izes the illumination light is formed in an illumination system 13, the controllable polarizing filter 15 is electrically combined with optical system 10.

[0015] The control unit 2 builds in a change means 17 synchronize alternative storing in change control of a storage means 16 have memory 16a for usual images for usually storing an image and a nonreflective image separately, respectively, and memory 16b for nonreflective images, and a polarizing filter 15, and the correspondence memory of each image, and control, and a selection means 18 take out an image from each memory 16a and 16b in the appointed mode further, and output to a display 3.

[0016] And it enables it to be operated by remote control with an actuation means 19 by which the change means 17 is attached in the image pick-up implement 1. If a polarizing filter 15 is controlled in the condition which can operate the change means 17 through the actuation means 19, and can penetrate the polarization by the polarizer 14 the direct reflected light is included -- at the same time an image is usually obtained -- this -- storing in memory 16a for usual images of an image should usually do, if a polarizing filter 15 is conversely controlled in the condition that polarization cannot penetrate The nonreflective image with which the direct reflected light was eliminated is obtained, and this nonreflective image is stored in memory 16b for nonreflective images.

[0017] thus, the serial mode to which the image once stored in the storage means 16 performs sequential playback of each image -- that is, -- usually -- observation mode -- or it is chosen by the selection means 18 about any in juxtaposition mode which perform coincidence juxtaposition playback of both images, and a display 3 is reproduced in the mode based on this

selection result.

[0018] The example of the 2nd ***** is an example using the illumination light of different conditions alternatively, and shows the structure of the image pick-up implement 50 for it. That is, the image pick-up implement 50 is equipped with the illumination system unit which consists of the built-in light source 53 and a condensing multiplex-type guide 54 for irradiating the illumination light from this light source 53 on conditions like the after-mentioned at an observation object while it builds the optical-system unit 51 and the image pick-up system unit 52 in that interior, as shown in drawing 2 .

[0019] The light sources 53 are the optical fibers 56 and 56 of a large number which draw light from luminescence Hara outside drawing, and the thing of which arranges an exposure edge in the shape of a circular ring, and is formed, as shown in drawing 4 . Three circular ring [the relation from which the condensing guide 54 is a triplex like the after-mentioned in this example to] 56a, It is divided into 56b and 56c, and each circular rings 56a, 56b, and 56c correspond to each of the below-mentioned 1st condensing means 60, the 2nd condensing means 70, and the 3rd condensing means 80. And it enables it, as for each circular rings 56a, 56b, and 56c, to control and adjust each according to an individual further in the existence and the quantity of light which carries out a light guide of a light guide.

[0020] In this example, as shown in drawing 3 $R > 3$, let the condensing multiplex-type guide 54 be a triplex by combining three condensing means, the 1st condensing means 60, the 2nd condensing means 70, and the 3rd condensing means 80, with a nest type in piles.

[0021] It becomes the anterior part 60f, 70f, and 80f which each condensing means 60, 70, and 80 are built with a transparent material [like acrylic resin] whose all are, and was made into the shape of a hollow hemisphere from the posterior parts 60r, 70r, and 80r made cylindrical, and through-holes 61, 71, and 81 are formed in the anterior part [60f, 70f, and 80f] core, respectively.

[0022] And the inner circle wall 62 of the through-hole 61 of the 1st condensing means 60 is formed in the abbreviation perpendicular, and the illumination light to which the interior has been led by total reflection carries out outgoing radiation horizontally from the inner circle wall 62 of a through-hole 61. Moreover, it is formed in the state of the inclination where the inner circle walls 72 and 82 of through-holes 71 and 81 narrow the point, respectively, and mirror plane processing is performed, and he is trying to be caudad reflected by these inner circle walls 72 and 82 about each 2nd and 3rd condensing means 70 and 80 in the illumination light to which the interior has been led by total reflection. And further, a through-hole 71 is larger than the through-hole 61 of the 1st condensing means 60, the 2nd condensing means 70 is carried out, a through-hole 81 is smaller than the through-hole 61 of the 1st condensing means 60, and another side and the 3rd condensing means 80 are carried out.

[0023] It can also be used in such a condensing multiplex-type guide 54, being able to choose side **** Ls, the transmitted light Lt, and an overhead light Ld as arbitration, and being able to mix each exposure light by the proper ratio. As shown in drawing 5 , side **** Ls which carries out outgoing radiation horizontally from the inner circle wall 62 of a through-hole 61

with the 1st condensing means 60 is obtained. Namely, with the 2nd condensing means 70 Since the through-hole 71 is made larger than the through-hole 61 of the 1st condensing means 60 Once the exposure light caudad reflected by the inner circle wall 72 of a through-hole 71 penetrates the surface around an observation part in the perimeter of the observation part in the observation object M, It becomes the transmitted light Lt which is reflected inside, sees and illuminates a part from the interior. Further with the 3rd condensing means 80 Since the through-hole 81 is made smaller than the through-hole 61 of the 1st condensing means 60, the exposure light caudad reflected by the inner circle wall 82 of a through-hole 81 will illuminate an observation part from right above [abbreviation] as an overhead light Ld.

[0024] And side **** Ls depended on each condensing means 60, 70, and 80, the transmitted light Lt, and an overhead light Ld can be used for them by the proper ratio, being able to mix each while being able to choose them as arbitration by controlling and adjusting the existence and the amount of light guides of the light guide about each circular rings 56a, 56b, and 56c of the light source 53.

[0025] Control of the light guide condition to each circular rings 56a, 56b, and 56c It is what is made by controlling supply of the illumination light to the optical fiber 56 corresponding to each circular rings 56a, 56b, and 56c in luminescence Hara outside drawing. By interlocking this control with the change means 17 in drawing 1 , and the same change means, the various images in the lighting by each lighting conditions alternatively acquired as mentioned above are storable in the storage means 16 in drawing 1 , and the same storage means. In addition, since three sorts of lighting conditions can be chosen in the case of this example, it is also possible for three memory to be prepared in a storage means, for three sorts of images stored in each to be chosen suitably, and for it to be able to be made to carry out juxtaposition playback.

[0026] Although the condensing guide of a triplex is used as a selection means of lighting conditions in the above example [2nd], of course, it is also possible for it to be made to choose lighting conditions using the technique shown in Japanese Patent Application No. No. 201387 [two to], Japanese Patent Application No. No. 201386 [two to], Japanese Patent Application No. No. 201384 [two to], etc.

[0027]

[Effect of the Invention] As the expansion observation equipment by this invention was explained above, each image of the observation object alternatively caught on condition that the different species which can be switched is not only alternatively observable, but coincidence juxtaposition-observation of each image is possible and it can realize observation which demonstrated further further the advantage in expansion observation of a video system method.

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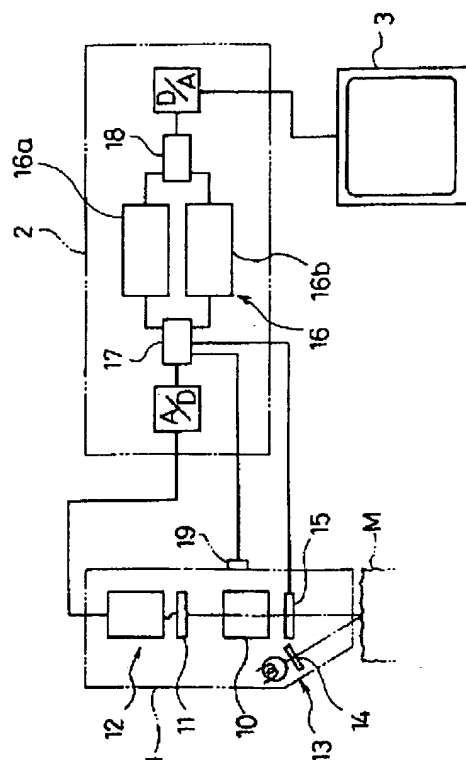
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(54) 【発明の名称】 並列観察可能な拡大観察装置

(57) 【要約】

【目的】 ビデオシステム方式の拡大観察装置について、撮像条件が異なる異質の画像を同時並列的に観察可能とする。

【構成】 選択的に切り換え可能な異種の条件で捉えた観察物の各画像を条件の切り換えに連動させて記憶手段に格納し、この記憶手段に格納した異質の各画像をディスプレイに同時並列的に再生できるようにしており、偏光照明の場合については、偏光子 14 による偏光を含む通常画像と偏光フィルタ 15 により偏光を除去された無反射画像の二種の画像を選択的に捉えることができるようにし、この二種の画像を偏光フィルタの切換え制御に連動させて通常画像用メモリ 16a と無反射画像用メモリ 16b からなる記憶手段 16 に格納するようにしている。



【特許請求の範囲】

【請求項1】 観察物の像を結像させる光学系、光学系で結像させた像を捉える撮像系、及び観察物を照明する照明系を有する撮像具にて捉えた観察物の像をディスプレイに表示して観察するようにしてなる拡大観察装置において、選択的に切り換え可能な異種の条件で捉えた観察物の各画像を条件の切り換えに連動させて記憶手段に格納し、この記憶手段に格納した異質の各画像をディスプレイに同時並列的に再生できるようにしたことを特徴とする並列観察可能な拡大観察装置。

【請求項2】 照明系による照明光を偏光化する偏光子及び観察物で反射された偏光の光学系への入射を選択的に遮断可能な偏光フィルタを備えており、偏光を含む通常画像と偏光を含まない無反射画像の二種の画像を選択的に捉えることができるようにされ、この二種の画像を偏光フィルタの切換え制御に連動させて記憶手段に格納できるようにされた請求項1に記載の拡大観察装置。

【請求項3】 照明系が落射光、側射光、及び透過光の3種の照明光の何れか2種又は3種について選択的に照射可能である照明手段を備えており、これら3種の照明光の何れかによる照明で得られる各画像を照明条件の切り換えに連動させて記憶手段に格納できるようにされた請求項1に記載の拡大観察装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、美容、医療、学術、工業等の各種分野で種々の観察物を手軽に拡大観察するのに好適なビデオシステム方式の拡大観察装置に関する。

【0002】

【従来の技術】ビデオシステム方式の拡大観察装置は、例えばCCDのような固体撮像素子を利用した撮像具と、この撮像具で撮像した観察物の像を再生して観察するためのモニタディスプレイとよりなるもので、その撮像具は、固体撮像素子やその受光面に観察物の像を結像させる光学系を内蔵すると共に、観察物を照明する照明系を内蔵しており、内蔵の照明系で照明しつつ観察物の像を取り込めるようになっている。このため、ビデオシステム方式の拡大観察装置は、観察対象物に何らの加工を施さずに観察でき、例えば20～1000倍と言った倍率での拡大観察を手軽に行なえるという長所をその一つとして持っている。

【0003】ところで、このようなビデオシステム方式の拡大観察装置については、異なる条件で照明を行ったり、あるいは異なる条件で捉えた像を同時並列的に観察できるようにしたり、さらに異なる条件の画像を合成した画像で観察できるようにすれば、多様な角度での観察や分析的な観察が可能となり、その長所をさらに有効に活用することが期待できる。

【0004】その一つとして、例えば特開平2-207401号に見られるように、観察物の表面で直接的に反

射する直接反射光を含む通常画像とこのような直接反射光を含まない無反射画像とを偏光の利用により選択的に得られるようにする技術がある。

【0005】これは、観察物の表面で直接的に反射された光はその偏光性をそのまま維持しているが、直接反射でない光は自然光化するという現象を利用したもので、直接反射光を含む通常画像は、立体感には富むものの色相の分別性に乏しく、またハレーションも生じ易く、逆に無反射画像は、色相の分別性やハレーションの点では優れているものの立体感に乏しい、というように一長一短を有する各像を選択的に取って比較観察することにより各像の長所を活かそうとするものである。

【0006】また、特願平3-38968号、特願平2-201387号、特願平2-201386号、特願平2-201384号等に開示されるように、各種の照明光を選択的に照射できるようにする技術がある。即ち、これらの技術は、先端部に通孔を有する半球状の集光ガイド（導光キャップ）を利用することにより、観察物を正面から照らす落射光、観察物の正面に対し平行に近い急角度で照射する側射光、及び透光性の観察物の場合に内部に透過した光で内側から表層を照らす透過光という3種の照明光について選択的な使用を可能としている。

【0007】つまり、落射光は、全体的な立体観察に秀れているが、表面反射光つまり照射光が観察物の表面で直接反射してくる光の影響で、部分的に見えない部分が生じたり、観察物の色彩の観察がしづらいという短所があり、また側射光は、急角度での照射により陰影を与えることで落射光だけでは見えにくいような立体構造の観察を可能とするのに秀れており、さらに透過光は、透光性の観察物の場合にしか使えないが、観察物の表層にある程度の深さを以て影絵的に観察できるというように、それぞれが固有の長所と短所を持っているが、これらの照明光を選択的に使用可能とすることにより、より有効な観察を行えるようにしている。

【0008】しかし、これらの技術は、何れも異種の条件で捉えた像を継時的に対比観察できるだけで、より一層効果的である各像の同時並列的観察を行なえないという点で未だ不十分なものがある。

【0009】

【発明が解決しようとする課題】したがって、本発明では、異質の画像を同時並列的に観察可能とする拡大観察装置の提供を目的とする。

【0010】

【課題を解決するための手段】このような目的のために本発明では、観察物の像を結像させる光学系、光学系で結像させた像を捉える撮像系、及び観察物を照明する照明系を有する撮像具にて捉えた観察物の像をディスプレイに表示して観察するようにしてなる拡大観察装置において、選択的に切り換え可能な異種の条件で捉えた観察物の各画像を条件の切り換えに連動させて記憶手段に格

納し、この記憶手段に格納した異質の各画像をディスプレイに同時並列的に再生できるようにしている。

【0011】また、本発明では、上記のような構造について、照明系による照明光を偏光化する偏光子及び観察物で反射された偏光の光学系への入射を選択的に遮断可能な偏光フィルタを設け、偏光を含む通常画像と偏光を含まない無反射画像の二種の画像を選択的に捉えることができるようにし、この二種の画像を偏光フィルタの切換え制御に連動させて記憶手段に格納できるようにしている。

【0012】さらに、本発明では、上記のような構造について、照明系に落射光、側射光、及び透過光の3種の照明光の何れか2種又は3種を選択的に照射可能な照明手段を設け、これら3種の照明光の何れかによる照明で得られる各画像を照明条件の切り換えに連動させて記憶手段に格納できるようにしている。

【0013】

【実施例】以下、本発明の実施例を説明する。

第1実施例

この実施例は、偏光を利用する例で、そのための拡大観察装置は、図1に示すように、撮像具1、コントロールユニット2、及びディスプレイ3を備えており、撮像具1で捉えた観察物Mの像をコントロールユニット2を介してディスプレイ3の画面に再生して観察を行なうようになっている。

【0014】撮像具1は、光学レンズや絞り等を含んだ光学系10、CCDのような固体撮像素子11を用いた撮像系12、及び観察物Mを照明する照明系13を内蔵しており、照明系13には照明光を偏光化する偏光子14が設けられると共に、光学系10には電氣的に制御可能な偏光フィルタ15が組み合わされている。

【0015】コントロールユニット2は、通常画像及び無反射画像をそれぞれ別々に格納するための通常画像用メモリ16aと無反射画像用メモリ16bを有する記憶手段16、偏光フィルタ15の切換え制御及び各画像の対応メモリへの選択的格納を同期させて制御する切換え手段17、さらに各メモリ16a、16bから画像を指定のモードで取り出してディスプレイ3に出力する選択手段18を内蔵している。

【0016】そして、切換え手段17は撮像具1に取り付けられている操作手段19にて遠隔操作を行なえるようにされており、操作手段19を介して切換え手段17を操作して偏光子14による偏光が透過可能な状態に偏光フィルタ15を制御すると、直接反射光を含む通常画像が得られると同時に、この通常画像の通常画像用メモリ16aへの格納がなされ、逆に偏光フィルタ15を偏光が透過できない状態に制御すると、直接反射光が排除された無反射画像が得られ、この無反射画像が無反射画像用メモリ16bに格納される。

【0017】このようにして記憶手段16に一旦格納さ

れた画像は、各画像の順次的再生を行なう順次モードつまり通常観察モードか又は両画像の同時並列的再生を行なう並列モードの何れかについて選択手段18により選択され、この選択結果に基づいたモードでディスプレイ3に再生される。

【0018】第2実施例

この例は、異なる条件の照明光を選択的に用いる例で、そのための撮像具50の構造を示す。即ち、撮像具50は、図2に示すように、その内部に光学系ユニット51及び撮像系ユニット52を内蔵すると共に、内蔵の光源53と、この光源53からの照明光を観察物に後述のような条件で照射するための多重式の集光ガイド54とよりなる照明系ユニットを備えている。

【0019】光源53は、図4に示すように、図外の発光原から光を導くようになっている多数の光ファイバ56、56、……の照射端を円環状に配列して形成されるもので、この例では後述のように集光ガイド54が三重式になっている関係から3個の円環56a、56b、56cに分けられており、各円環56a、56b、56cが後述の第1集光手段60、第2集光手段70、及び第3集光手段80のそれぞれに対応するようになっている。そしてさらに、各円環56a、56b、56cは、それぞれが個別に導光の有無や導光する光量を制御・調整できるようにされている。

【0020】多重式の集光ガイド54は、この例では図3に示すように、第1集光手段60、第2集光手段70、及び第3集光手段80の3個の集光手段を入れ子式に重ねて組み合わせることにより三重式とされている。

【0021】各集光手段60、70、80は、何れも例えばアクリル樹脂のような透明な素材でつくられるもので、中空半球体状とされた前部60f、70f、80fと、円筒状とされた後部60r、70r、80rよりなり、前部60f、70f、80fの中心にはそれぞれ通孔61、71、81が設けられている。

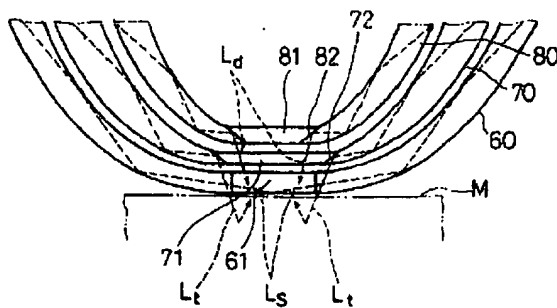
【0022】そして、第1集光手段60の通孔61の内周壁62は略垂直に形成されており、内部を全反射により導かれてきた照明光が通孔61の内周壁62から水平方向に射出するようになっている。また、第2及び第3の各集光手段70、80については、それぞれ、通孔71、81の内周壁72、82が先窄まりの傾斜状態で形成され、且つ鏡面処理が施されており、内部を全反射により導かれてきた照明光がこの内周壁72、82により下方に反射されるようにされている。そしてさらに、第2集光手段70は、通孔71が第1集光手段60の通孔61より大きくされ、他方、第3集光手段80は、通孔81が第1集光手段60の通孔61より小さくされている。

【0023】このような多重式の集光ガイド54では、側射光Ls、透過光Lt、及び落射光Ldを任意に選択でき、また、適宜の比率で各照射光を混合させて使用す

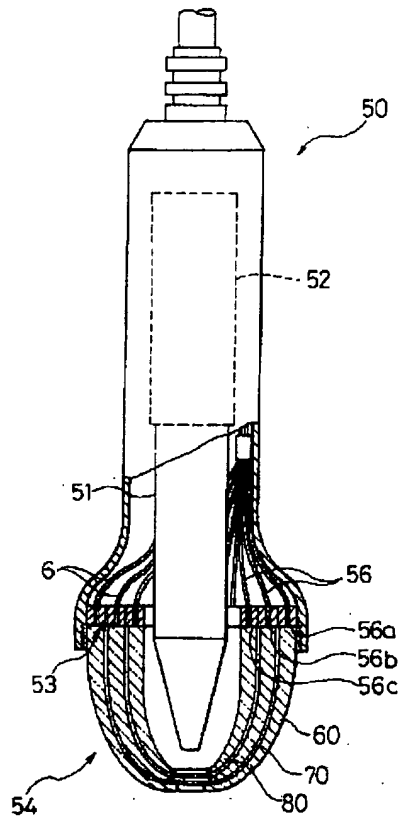
【００２６】以上の第２実施例では照明条件の選択手段として三重式の集光ガイドを用いているが、この他に特願平２－２０１３８７号、特願平２－２０１３８６号、特願平２－２０１３８４号等に示される技術を用いて照

- 1 撮像具
- 2 コントロールユニット
- 3 ディスプレイ
- 10 光学系
- 12 撮像系
- 13 照明系
- 14 偏光子
- 15 偏光フィルタ
- 16 記憶手段
- 16 a 通常画像用メモリ
- 16 b 無反射画像用メモリ
- 17 切換え手段
- M 観察物
- L d 落射光
- L s 側射光
- L t 透過光
- 54 集光ガイド（照明手段）

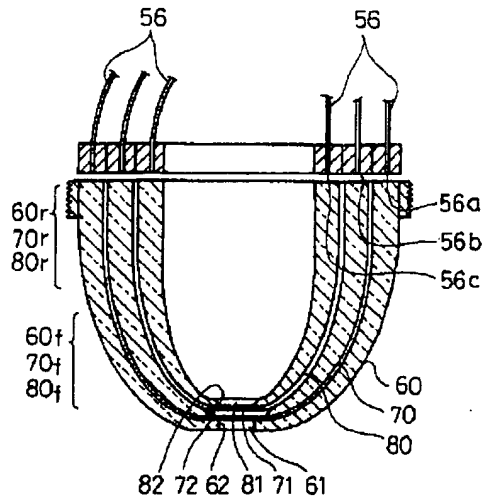
【图5】



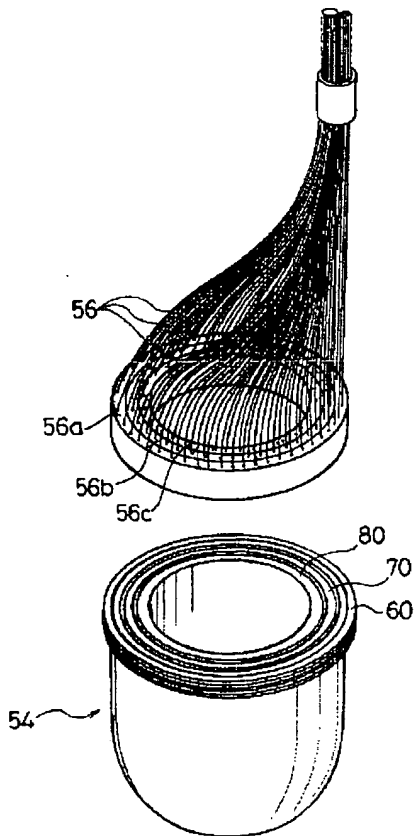
【図 2】



【図 3】



【図 4】



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【手続補正書】

【提出日】平成5年7月27日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】図面の簡単な説明

【補正方法】変更

【補正内容】

【図面の簡単な説明】

【図1】本発明の実施例による拡大観察装置の構成図。

【図2】他の実施例による拡大観察装置における撮像具の側面図。

【図3】集光ガイドの断面図。

【図4】集光ガイドと光源との関係を示す斜視図。

【図5】集光ガイドにおける照射光の状態を示す説明図。

【符号の説明】

1 撮像具

2 コントロールユニット

3 ディスプレイ

10 光学系

12 撮像系

13 照明系

14 偏光子

15 偏光フィルタ

16 記憶手段

16a 通常画像用メモリ

16b 無反射画像用メモリ

17 切換え手段

M 観察物

Ld 落射光

LS 側射光

Lt 透過光

54 集光ガイド（照明手段）